

CA-NV AWWA Water Loss Technical Assistance Program Wave 4 Water Audit Level 1 Validation Document

Audit Information:

Utility: Manhattan Beach PWS ID: 1910083
System Type: Potable Audit Period: Fiscal Year 2016/17
Utility Representation: Shawn Igoe, Mark Wood
Validation Date: 7/25/2017 Call Time: 9am Sufficient Supporting Documents Provided: Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 61 Data Validity Band (Level): Band III (51-70)
ILI: 0.62 Real Loss: 7.79 (gal/conn/day) Apparent Loss: 7.30 (gal/conn/day)
Non-revenue water as percent of cost of operating system: 3.1%

Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

Validator Information:

Water Audit Validator: Kate Gasner / Kevin Burgers (support) Validator Qualifications: Contractor for CA-NV AWWA Water Loss TAP

Validator Provided

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Water System Name:

Water System ID Number:

Water Audit Period:

Water Audit & Water Loss Improvement Steps:

Steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

<<Information to be completed by Utility>>

Utility Provided

Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Shawn Igoe
Executive Name (Print)

Utilities Manager
Executive Position

10/2/17
Date


Signature

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#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
1	Volume from Own Sources	VOS	5	Supply meter profile: There are 2 groundwater wells, though only 1 was active in FY16/17. One well was offline for maintenance purpose. Active meter is a 12" propeller. VOS input derived from: Manual reads from production meters as archived. Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of own supply metered: 100% Signal calibration frequency: Annual. Volumetric testing frequency: Within last 5 years but less than annually. Volumetric testing method: Pitot Tube Percent of own supply volumetrically tested: 100% Comments: No additional comments.
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	Input derivation: Adjusted based on the results of accuracy test. Net storage change included in MMSEA input: No. Comments: No additional comments.	Supply meter read frequency: Daily. Supply meter read method: Manual. Frequency of data review for trends & anomalies: Each business day. Storage levels monitored in real-time: Yes. Comments: No additional comments.
3	Water Imported	WI	7	Import meter profile: Water imported from MWD through 1 meter. Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of import supply metered: 100% Signal calibration frequency: Semi-annual. Volumetric testing frequency: None. Percent of import supply volumetrically tested: 0% Comments: No additional comments.
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	8	Input derivation: Left blank in absence of available test data. Comments: No additional comments.	Import meter read frequency: Continuous. Import meter read method: Manual and automatic logging. Frequency of data review for trends & anomalies: Each business day. Comments: No additional comments.
5	Water Exported	WE	n/a	Export meter profile: Connections exist for emergency use only.	Comments: No additional comments.
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	n/a	Comments: No additional comments.	Comments: No additional comments.



#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
7	Billed metered	BMAC	5	<p>Customer meter profile: Age profile: Half of meters replaced within last 7 years, half within 15 years. Reading system: Manual. AMI piloted and planned for full conversion in coming years. Read frequency: Bi-monthly. Comments: Lag-time correction is not employed in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.</p>	<p>Percent of customers metered: 100% Small meter testing policy: Reactive - complaint based or flagged-consumption testing only. Number of small meters tested/year: 5 Large meter testing policy: Reactive - complaint based or flagged-consumption testing only. Number of large meters tested/year: 0 Meter replacement policy: Upon failure only. Number of replacements/year: Very few Billing data auditing: Standard billing QC, plus review of volumes by use type each billing cycle. Comments: Replacement program put on hold due to pending AMI implementation</p>
8	Billed unmetered	BUAC	n/a	Profile: No usage	Comments: No additional comments.
9	Unbilled metered	UMAC	n/a	Profile: Some UMAC exists for temporary construction meters, though the volume is currently quantified as BMAC.	Comments: No additional comments.
10	Unbilled unmetered	UUAC	5	<p>Profile: Operational flushing and fire department usage. Comments: Flushing activities greatly scaled back due to drought. Custom California default of 0.25%\timesWS utilized.</p>	Comments: Default grade applied.
11	Unauthorized consumption	UC	5	Comments: Default input applied.	Comments: Default grade applied.
12	Customer metering inaccuracies	CMI	3	<p>See BMAC comments regarding meter testing & replacement activities. Input derivation: Inferred from reference data (manufacturer, anecdotal test results) but not derived from test data analysis & calculation. Comments: No additional comments.</p>	<p>Characterization of meter testing: Limited (upon request AND consumption flag only). Characterization of meter replacement: Limited (upon failure only). Comments: No additional comments.</p>
13	Systematic data handling errors	SDHE	5	Comments: Default input applied.	Comments: Default grade applied.
14	Length of mains	Lm	9	<p>Input derivation: Totaled from GIS based map. Hydrant leads included: Yes. Comments: No additional comments.</p>	<p>Mapping format: Digital. Asset management database: In place and integrated with GIS system. Map updates & field validation: Accomplished through normal</p>



#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
					work order processes. Comments: No additional comments.
15	Number of service connections	Ns	8	Input derivation: Standard report run from billing system. Basis for database query: Meter ID - non-premise based. Comments: No additional comments.	CIS updates & field validation: Accomplished through normal meter reading processes. Estimated error of total count within: 2%. Comments: No additional comments.
16	Ave length of cust. service line	lp	10	Comments: Default input and grade applied, as customer meters are typically located at the property boundary given California climate.	
17	Average operating pressure	AOP	9	Number of zones, general profile: System has 2 pressure zones. One large one and one smaller zone. Typical pressure range: 50 – 100 psi Input derivation: Calculated as simple average from analysis of field data. Comments: No additional comments.	Extent of static pressure data collection: Hydrant pressures taken during routine system flushing and/or hydrant testing. Characterization of real-time pressure data collection: Full-scale - telemetry or pressure logging (including seasonal variations) in place beyond the boundary points in all zones representing full pressure profile. Hydraulic model: One exists but has not been calibrated within the last 5 years. Comments: No additional comments.
18	Total annual operating cost	TAOC	10	Input derivation: From internal budgeting reports. Comments: Confirmed costs limited to water only, and water debt service included.	Frequency of internal auditing: Annually. Frequency of third-party CPA auditing: Annually. Comments: No additional comments.
19	Customer retail unit cost	CRUC	5	Input derivation: Single rate class selected, with some rate classes excluded. Sewer charges are based on water meter readings. Sewer revenues are not incorporated into calculation. Comments: No additional comments.	Characterization of calculation: Weighted average but not composite of all rates. Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.
20	Variable production cost	VPC	5	Supply profile: Own sources and import supply. Primary costs included: Treatment chemicals, supply & distribution power, and purchase costs. Secondary costs included: None currently included. Comments: No additional comments.	Characterization of calculation: Primary costs only. Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.



Key Audit Metrics

(~)	VALIDITY	Data Validity Score: 61	Data Validity Band (Level): Band III (51-70)
(#)	VOLUME	ILI: 0.62 Real Loss: 7.79 (gal/conn/day)	Apparent Loss: 7.30 (gal/conn/day)
(\$)	VALUE	Annual Cost of Apparent Losses: \$208,487	Annual Cost of Real Losses: \$206,853

Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Unknown at time of call.

Infrastructure replacement policy (current, historic): Robust capital improvement

program with \$1.5 million/year budgeted for replacement.

Estimated main failures/year: 6

Estimated service failures/year: Few, and mostly caused by contractor error.

Extent of proactive leakage management: None

Other water loss management comments: No additional comments.

Comments on Audit Metrics & Validity Improvements

The Infrastructure Leakage Index (ILI) of 0.62 describes a system that experiences leakage at 0.62 times the modeled technical minimum for its system characteristics.

While this system may experience low volumes of leakage, the ILI after level 1 validation indicates that advanced validation is warranted before conclusions can be made regarding the system's leakage. At least one of the following scenarios may contribute to this result:

- **Water Supplied (both Own Source and Imported Water) may be understated.** This can occur if supply meters are under-registering more significantly than is currently reflected in the Master Meter Error & Supply Adjustment (MMSEA). This can also occur if the supply volumes include uncorrected inaccuracies in the data archives due to data gaps or SCADA formula errors.
- **Authorized consumption may be overstated.** This can occur if sales volumes have not been pro-rated to align consumption with dates of actual use instead of the dates of meter reads. This can also occur if the BMAC input includes any non-potable volumes or duplication/exclusion of potable volumes.
- **The estimate of average operating pressure may be too high,** thereby overestimating the technical minimum volume of leakage for the system.

The Data Validity Score falling within Band III (51-70) suggests that next steps may be focused simultaneously on improving data reliability and evaluating cost-effective interventions for water & revenue loss recovery. Opportunities to improve the reliability of audit inputs and outputs include:

- Temporal alignment of Billed Metered Authorized Consumption with Water Supplied: consider pro-rating the first and last months of the audit period to better align consumption with actual dates of use, and using read date as basis for reporting.
- Improved estimation of CMI: consider a customer meter testing program which tests a sample of random meters whose stratification (by size, age, or other characteristics) represents the entire customer meter stock.



- Improved understanding of Supply Meter (Own or Import) Master Meter Error: consider adopting or increasing the rigor of a source meter volumetric testing and calibration program, informed by the guidance provided in AWWA Manual M36 – Appendix A.

When the CA-NV AWWA Water Audit Validator (WAV) program comes online after this year, is the utility planning on having a staff member become certified to perform the Level 1 Validation for future audits? Yes.